ditions breed pestilence in order to present sufficient reason to abate them.

Failure to discover an increase in specific disease does not, of course, prove that harm is not done to public health by the existence of insanitary conditions. The methods of inquiry employed in such investigations are too crude to detect the whole extent of the injury even if considerable harm is done. Only the most conspicuous evils, such as cases of specific intestinal diseases, are generally accepted as indicating the extent of the consequences. The more subtile effects, such as those which are produced by insufficient air, food, sunlight, exercise and rest, can not so readily be detected, measured and traced; therefore, when they are recorded against insanitary conditions at all, they are generally attributed to them in such a vague, uncertain way as to fail to convey a proper sense of their importance. That a very real impairment of vigor, and consequently health, may occur among persons who are compelled to dwell among insanitary conditions will be freely admitted by all. Disease aside, this impairment of health means impairment of efficiency in the capacity to do work.

The most convincing proof of a connection between polluted harbors and specific disease lies in the results of eating shell-fish. There have been more than enough cases of typhoid fever and gastroenteritis reliably ascribed to the eating of oysters, clams and other shell-fish derived from polluted waters to show the danger in this direction. Shell-fish taken from sewage-polluted water are polluted themselves. They are likely to cause typhoid fever if eaten raw. Cases have been known to arise merely from handling the shells. The total amount of sickness caused by impure shell-fish is not even approximately known. Only some of the most striking and most obvious cases are likely to be traced.

Within the last five years much attention has been directed to the absence of sanitary jurisdiction over the cultivation and handling of shell-fish, with the result that health authorities and others have been moved to abate some of the most dangerous practices. Improvements in the cultivation of shell-fish have been made in Europe and America, but a great deal remains to be done. In some harbors it would appear that the shell-fish industry must be given up. In others a careful management of the sewage will suffice. In view of the enormous value of the shell-fish industries, which now amount in the United States to over 50 per cent. of the total value of our fisheries, it seems incredible that the oystermen, many of whom are intelligent and of ample means, should be willing to continue to grow and handle their shell-fish in an insanitary manner. One would expect them to be the first to take the necessary steps for the protection of their business.

SANITARY JURISDICTION OVER TIDAL HARBORS

The form of sanitary jurisdiction which should be exercised over a tidal harbor must depend on the local circumstances. Over matters which are certainly of public health import, it is obvious that boards of health should have jurisdiction. Where questions affecting public comfort and well-being are alone concerned, some other form of jurisdiction is, at least, equally appropriate. The main authority in charge of the sanitary protection of the Thames is not a public health body. The various royal commissions on sewage disposal of Great Britain have, with one exception, not been health boards.

The various rivers boards of England, which are doing good work for the sanitary protection of watercourses, are committees composed of local authorities and are charged with the special duty of preventing nuisances. The last report of the (temporary) Royal Commission on Sewage Disposal has recommended the creation of a permanent central authority which shall carry on suitable investigations and be ready to give expert advice to local authorities as to methods for the sanitary disposition of sewage.

In Germany the imperial board of health exercises jurisdiction over the streams only in so far as health is surely concerned. The sanitary improvement and protection of the rivers, so that they may be more suitable for the enjoyment and use of the public, devolve on other authorities.

In America, where there is no central health authority, the protection of the watercourses is left to the care of the individual states. Some states require that all plans for sewerage, as well as sewage purification, shall be passed on by the state board of health before they are carried out. American harbors are protected, where any protection exists, chiefly through works constructed by sanitary authorities, such as sewerage commissions, which have no jurisdiction over the matters of public health. The need and nature of such work are often determined by a special board of commissioners. This has been true of Boston and Baltimore. The preparatory investigation now being made to determine how best to protect the sanitary condition of New York harbor has been placed by the State of New York in the hands of a commission of four engineers and one physician, called the Metropolitan Sewerage Commission. The duties of this body are plainly specified in the act of the legislature which brought it into existence (Chapter 639, Laws of 1906, amended by Chapter 422, Laws of 1908).

17 Battery Place.

Original Articles

THE RESULTS OF DRUG TREATMENT IN FIVE HUNDRED CASES OF DELIRIUM TREMENS

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An attempt has been made in this investigation to determine, as well as may be by statistical methods, the relative value of the various drugs commonly used in the treatment of delirium tremens. The conclusions reached as a result of a careful study of 500 cases may be summarized as follows:

1. In incipient cases the patients respond readily to treatment with chloral, ergot, bromids and whiskey, the drugs being mentioned in the order of their value.

2. Delirious patients are very resistant to treatment. In the cases studied the administration of the sedative drugs increased the mortality. This was most evident when scopolamin was used, that drug increasing the mortality 13 per cent. These unsatisfactory results with the sedative drugs were due to the large doses used. It will be shown that small quantities, for example, 15 to 30 grains of chloral in twenty-four hours,

may be given with good results, but that when larger quantities are given the death rate increases with the amount of sedative administered.

3. The only drug which reduced the mortality was ergot. By its use the death rate was decreased 21.6 per cent.

4. When whiskey was given the mortality was increased 1.8 per cent.

The 500 cases which serve as a basis for this paper are those of patients treated at the Cook County Hospital, Chicago, during a period of three years, extending from June, 1905, to August, 1908. This represents only a part of the total number of such cases in the hospital during that period. The cases developing in the hospital while the patients were under treatment for other conditions are not included in this series, because the histories of these cases were filed in the hospital records under the heading of the original maladies and were not readily accessible. The remaining cases, in which mania a potu was the chief evidence of disease, and whose histories were filed under the head of alcoholism, were the ones utilized in compiling the following statistics. It is believed that the relatively uncomplicated nature of these cases makes them particularly suitable for such a study.

It must not be supposed, however, that these 500 cases presented no complications, but rather that the complications were only of minor importance. The nature and frequency of the complications can be understood by a glance at Table 1. It will be seen that in a large number of the cases the complications were due to chronic alcoholism, and that serious conditions, like fractures and pneumonia, which are so commonly associated with delirium tremens, are relatively rare in this series of cases.

Table 1.—Complications

Complication.	Recovered.	Died.	Complication.	Recovered.	Died.
Acute dilatation of			Hernia	1	1
stomach	1	0	Hemorrhoids	1	0
Bronchitis	3	0	Infections, cellulitis, etc.	2	9
Carcinoma	1	0	Influenza	1	0
Cardiospasm	1	0	Morphinism	7	0
Catarrhal jaundice	1	0	Neuritis	3	1
Cerebral hemorrhage	1	0	Nephritis	41	25
Cholecystitis	1	0	Organic heart disease	13	6
Cirrhosis of liver	9	6	Pleurisy	1	2
Corneal ulcer	1	0	Pneumonia	4	10
Dementia	1	0	Pregnancy	2	0
Dislocations and			Prolapsed uterus	1	0
sprains	1	3	Pulmonary tuberculosis	1	2
Enteritis	1	0	Rheumatism	0	3
Epilepsy	6	2	Tabes dorsalis	2	0
Exposure	1	0	Varicose veins	2	0
Fractures	4	9	Venereal diseases	6	0
Gastritis	11	0	Wounds	12	13

In collecting the statistics the original history was examined in each case and the relevant facts transcribed to a library card. Each card was made to show the age and sex of the patient, whether the case was incipient or fully developed, whether it developed from the incipient into the delirious stage in the hospital, and, if so, after how long and under what treatment, and also to show each drug used, with the size and number of the doses, together with the results of the treatment and the complications. The cards could then be sorted and the cases classified according to any one of the points noted.

The cards were first separated into two groups representing, respectively, the incipient and the fully-developed cases. The incipient cases were those which showed only insomnia, restlessness and tremor. In the fully developed cases the patients were noisy, delirious, with uncorrected hallucinations. In a number of cases the patients entered the hospital in the incipient stage and later became delirious. These cases enter twice into the statistics—first as incipient, later as developed cases—and, as there were 147 of them, there appear to be 647 cases, instead of 500 represented in Tables 2 and 3.

Table 2 gives in detail the results of treatment by the various drugs in the incipient cases. These results are expressed in terms of the percentage of patients that became delirious. Table 3 shows the results of treatment of the delirious patients, and here the mortality is used as the index. Since the drugs were often used in combination, it was not possible to compare a series in which one drug was used alone with another series in which some other drug was used alone. Accordingly each drug was considered separately, and the series in which it was used compared with the series in which it was not used.

Table 2.—Incipient Cases

Bromids used in	190 cases, delirium followed in	32.6%
Bromids not used in	156 cases, delirium followed in	52.8%
	Difference	20.2%
Chloral used in	86 cases, delirium followed in	20.6%
Chloral not used in	260 cases, delirium followed in	48.9%
	Difference	28.3%
Morphin used in	71 cases, delirium followed in	38.5%
Morphin not used in	275 cases, delirium followed in	42.5%
	Difference	4.0%
Scopolamin used in	39 cases, delirium followed in	36.0%
Scopolamin not used in	307 cases, delirium followed in	41.5%
	Difference	4.5%
Whisky used in	110 cases, delirium followed in	28.1%
Whisky not used in	236 cases, delirium followed in	48.3%
	Difference	20.2%
Ergot used in	75 cases, delirium followed in	23.6%
Ergot not used in	271 cases, delirium followed in	46.9%
	Difference	23.3%

Table 3.—Delirious Patients

Bromids used in	198 cases, with mortality of	45.5%
Bromids not used in	103 cases, with mortality of	40.8%
	Mortality increased	4.7%
Chloral used in	145 cases, with mortality of	44.9%
Chloral not used in	156 cases, with mortality of	42.9%
	Mortality increased	2.0%
Morphin used in	150 cases, with mortality of	43.3%
Morphin not used in	151 cases, with mortality of	44.7%
	Mortality decreased	1.4%
Scopolamin used in	110 cases, with mortality of	50.9%
Scopolamin not used in	191 cases, with mortality of	37.9%
	Mortality increased	13.0%
Whisky used in	131 cases, with mortality of	44.7%
Whisky not used in	170 cases, with mortality of	42.9%
	Mortality increased	1.8%
Ergot used in	80 cases, with mortality of	30.0%
Ergot not used in	221 cases, with mortality of	51.6%
	Mortality decreased	21.6%

Among the sedative drugs the bromids were most extensively used in the treatment of these cases. It was customary to give equal parts of sodium, potassium and ammonium bromid in doses of from 10 to 30 grains each, or 30 to 90 grains of the mixture every four hours. Table 3 shows that the bromids were used in 198 cases with delirium, with a mortality of 45.5 per cent., and that in 103 similar cases treated without bromids the death rate was only 40.8 per cent. This increase in the mortality, amounting to 4.7 per cent., was apparently due to the use of bromids. We believe, however, that Table 4 will show that the increased mortality was due to too large doses too frequently repeated, and that smaller quantities do good rather than harm. Better results were obtained with the incipient cases. In the 190 incipient cases in which the patients were treated with bromids, only 32.6 per cent. of the patients became delirious, while of 156 similar cases in which the patients were not so treated 52.8 per cent. of the patients became delirious. This represents a decrease of 20.2 per cent. in the patients developing delirium in the hospital.

Chloral was also extensively used in doses ranging from 10 to 30 grains, often repeated, every four hours, and frequently given in combination with the bromids. By reference to the tables it will be seen that chloral, as administered in these cases, is of no service after active delirium has set in. In fact, it seems actually to have increased the mortality by 2 per cent. It is in the treatment of the incipient cases that the great value of chloral is seen. It reduced the percentage of cases developing delirium in the hospital from 48.9 per cent. to 20.6 per cent., a decrease of 28.3 per cent. Chloral is of more value than bromids in the incipient cases because the patient can be put under its influence in a much shorter time.

Morphin is also practically useless in the cases with delirium, although instead of slightly increasing the mortality, as did chloral and the bromids, it reduced the mortality 1.4 per cent. This is probably to be explained by the fact that morphin was usually ordered in single ¼-grain doses, and thus relatively small quantities were given, while the bromids and chloral were ordered in relatively larger doses, and these were repeated every four hours. Thus in a few days the patient would get enormous quantities of the sedatives. The same reasoning accounts for the poor results in the incipient cases in which morphin reduced by only 4 per cent. the number of patients developing delirium. In these incipient cases the patients should be held steadily under the influence of regularly repeated doses of the sedatives.

Scopolamin was also given in single doses of 1/100 to 1/50 of a grain, and the series in which it was given, like the morphin series, illustrates the futility of single doses of sedatives in controlling the incipient cases. It decreased the number of patients developing delirium by only 4.5 per cent. But, unlike morphin, scopolamin is extremely dangerous in the delirious cases. Even when its use was as restricted and as carefully regulated as it was in this series of cases, it increased the mortality 13 per cent.

It will be seen that in this series the sedative drugs increased rather than decreased the mortality. The question naturally arises whether the sedatives are harmful to the delirious patients when given in any quantity whatsoever, or whether the bad results in this series of cases was not due to the use of too large amounts.

In order to answer this question, the cases were again tabulated according to the total quantity of sedatives given. An arbitrary unit for twenty-four hours was chosen, as 60 grains of chloral, and this unit was considered as equivalent to 3 drams of bromids, 3/50 of a grain of scopolamin, 1½ grains of morphin, 60 grains of veronal, 6 drams of paraldehyd, 2 drams of sulphonal, 3 fluidrams of tincture of hyoscyamus, or 6 grains of codein. Thus whatever sedative or combination of sedatives was used in any case the total amount given could be calculated and reduced to terms of the unit chosen. In only 285 of the cases with delirium were the data complete enough for this analysis. For each of these cases the number of units of sedative was calculated and the cases arranged according to the amount given. Table 4 shows the effects of various doses of sedatives:

TABLE 4.—RESULTS OF VARIOUS DOSES OF THE SEDATIVE DRUGS

Units for 24 Hours.	Equivalent in Chloral. Grs.	Number of Patients. Recovered.	Died.	Total.	Death Rate. %
0	0	10	14	24	58
¼	15	43	12	55	21.8
½	30	13	5	18	27.7
¾	45	11	5	16	31.2
1	60	29	22	51	43.1
2	120	21	28	49	57.1
3	180	13	27	40	67.5
4	240	12	20	32	62.5

It will be seen from Table 4 that when no sedative was used the mortality was high (58 per cent.) and that when small quantities (equivalent to 15 grains of chloral in twenty-four hours) were used the mortality fell to 21.8 per cent., and that the mortality increased rapidly as the dose was increased. The high mortality when no sedative was used is, in part, explained by the fact that a number of patients entered the hospital in a moribund condition and died in a short time, having received only stimulant drugs. I do not think that this accounts for the entire difference between the mortality of those patients who received small doses and the mortality of those who received none; for the majority of the patients who received no sedatives were treated on the homeopathic side of the hospital with homeopathic remedies. It seems clear, therefore, that small doses of sedatives equivalent to 15 grains of chloral in twenty-four hours favorably influence the course of the disease. It is certain that larger doses have a very unfavorable influence.

Whiskey was used rather extensively in these cases, notwithstanding the fact that its use is condemned by the majority of writers. It seems to have been of decided value in the incipient cases, lowering the percentage of patients becoming delirious by 20.2 per cent. In the cases with delirium the mortality was raised 1.8 per cent.

The drugs so far mentioned have increased the mortality of the delirious patients, except morphin, and its effect was practically negative. We come now to a drug which has produced a marked decrease in the mortality. This drug is ergot. It was usually given in the form of the fluidextract, in dram doses, repeated every four hours, and often in combination with whiskey. In those cases in which ergot was used the mortality was only 30 per cent., while among those patients treated without ergot it was 51.6 per cent. This is a reduction of 21.6 per cent. in the mortality. This result is striking when considered with reference to the uselessness of other drugs. Ergot is likewise of value in the incipient cases, the percentage of patients developing delirium being reduced 23.3 per cent. by its use.

The importance of ergot in the treatment of these patients may justify a little digression from the strictly statistical line of argument. Its use in the Cook County Hospital in the treatment of delirium tremens dates from the spring of 1907, and so favorable have been the results that it is now generally employed for that purpose by the resident staff of the institution. The beneficial results of its administration has seemed to me to be clearly demonstrated in those cases which have been under my care. It seems not so much to shorten the attack as to render the delirium much quieter, thus preventing death from exhaustion before the natural crisis arrives. Any attempt to explain its influence would be pure speculation. It is possible that it may act by decreasing the cerebral hyperemia. By equalizing the circulation it may tend to prevent the edema of the brain and meninges, "wet brain," so frequently seen at autopsies on cases of delirium tremens.

Stomachics were used extensively, but were not taken into account in these statistics.

Stimulants were used very little, alcohol alone being consistently used. Other stimulants were used only when the patient was in a moribund condition. It would be interesting to know what would be the effect of a systematic use of digitalis, caffein and strychnin throughout the course of the disease, but the series of cases under discussion does not furnish the necessary data.

It will be obvious from a study of the accompanying tables that drugs are not of such value in the treatment of these patients that other therapeutic measures can be neglected. This is especially true of the wildly delirious patients, for whom much more can be done by nursing than by drugs. But I can not here do more than emphasize the importance of proper methods of restraint, frequent administration of liquids and the use of sedative baths.

In the incipient cases much can be done with drugs. Large doses of the sedatives should be given, especially chloral and bromids, and these should be repeated every four hours and kept up for several days after all signs of the disease have disappeared. Whiskey should be given regularly. Ergot is also of value and may be given as the fluidextract, or in cases complicated with gastritis the aseptic preparations of ergot may be given hypodermically. In the hospital, dram doses of the fluidextract were given every four hours for a week and more without any bad effects. If a standardized preparation of the fluidextract were used, smaller doses would probably be equally effective. Stomachics are often indicated, especially capsicum. Stimulants, aside from alcohol, are unnecessary except in cases showing cardiac incompetence.

In the cases with delirium care must be taken not to overdose the patients. Sedatives may be used with care, not more than 30 grains of chloral or its equivalent in other sedatives being given in twenty-four hours. Scopolamin is dangerous and whiskey useless. Ergot seems to have been of the greatest value and certainly deserves an extended trial. It is a question whether stimulants should be given to all delirious patients, but when there are signs of failing heart action, of developing "serous meningitis," or when the patient is passing from delirium to stupor and coma, heart stimulants should be given hypodermically.

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TUBERCULOSIS

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It seems strange that after the many years of study devoted to tuberculosis by the medical profession, in medical schools and text-books on the practice of medicine, the fact that this is a general constitutional disease is apparently lost sight of; a good definition or a description of tuberculosis as such is rarely, if ever, seen.

Text-books all define pulmonary tuberculosis and fully describe its etiology, pathology, symptoms and treatment; casually mention in this connection the possibility of secondary infection of other organs and tissues, but describe these secondary manifestations of a general systemic infection under chapters devoted to such special organs or tissues. That this is illogical must be apparent to every thinking professional man.

Allow any patient afflicted with tuberculosis to go his way untreated and, sooner or later, secondary involvements are certain to manifest themselves. I have never seen at postmortem a single instance in which some such secondary lesion was not found in some organ or tissue, even though it had not been manifest clinically during life. I regret that this is not confined to untreated cases, for owing to our lack of knowledge in the past of the treatment of tuberculosis many patients have followed this course.

In all text-books this disease is usually defined and described along the lines laid down in a well-known text-book on the practice of medicine (edition of 1907), for the author of which I entertain the greatest respect and admiration, in which tuberculosis is defined in the following manner:

"Tuberculosis is a general or local infectious inflammatory disease, the result of the implantation and proliferation of the tubercle bacillus."

The first chapter considers etiology and discusses the tubercle. The disease is then classified under two divisions, acute and chronic tuberculosis, and these are subdivided as follows:

II.—Acute tuberculosis.
  1. Diffuse general tuberculosis (acute milliary).
  2. Pulmonary form of acute tuberculosis.
  3. Tuberculous meningitis.
III.—Chronic tuberculosis.
  1. Pulmonary tuberculosis.
    (a) Chronic ulcerative phthisis.
    (b) Fibroid phthisis.

The next chapter is headed:

IV.—Tuberculosis of lymphatic glands.
V.—Tuberculosis of the serous membranes.
  (a) Tuberculosis of the pleura.
  (b) Tuberculosis of the peritoneum.
VI.—Tuberculosis of the genitourinary organs.
VII.—Tuberculosis of the mammary glands.
VIII.—Tuberculosis of the heart and blood vessels.

Each of the chief foregoing chapters treats of the subject as if it were a distinct disease, giving definition, etiology, pathology, symptomatology, treatment and prophylaxis.

Among the chapters under the heading of tuberculosis we find no mention of that frequent pathologic condition, tuberculous laryngitis, but this important feature is considered under diseases of the larynx. Tuberculous infections of the serous membranes, and of the genitourinary tract, are considered as coming under the domain of the surgeon. Tuberculosis of the bones and of the joints is not mentioned, evidently being left to the text-books on surgery. Tuberculosis of the skin (lupus) is briefly mentioned in connection with the description of the tubercle bacillus.

I believe that, from our knowledge of tuberculosis, the definition above mentioned is manifestly wrong; tuberculosis is pre-eminently a disease of systemic infection, is constitutional in its character, and is never a local condition.

The classification into acute and chronic forms is not borne out by the facts; tuberculosis is never an acute process, but is necessarily a chronic condition pathologically: at times it does run a rapidly fatal course, but